

Ignition Spark Sensor Invention - Additional testing using an Automotive Timing Light as Sensor.

Robert Ponziani, one of two inventors of subject patent application.

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Test Setup

Test Conducted on May 25, 2005.

A Craftsman Automotive Inductive Timing Light Model # 161.213400 was selected for the test. There were no serial numbers present on the unit. The sensor end, or "pick-up", is an inductive coil device with a light metallic core, and resides in a spring-loaded clamp that is normally clamped around and surrounds the electrical lead to an automotive spark plug. When the clamp ends make contact as the clamp is closed, the unit will provide maximum signal strength to the electronics in the main body of the timing light.

It was initially tested on an automobile, which verified that it was in working condition. This unit was then used as part of the test set-up in a gas turbine development ignition lab. A standard gas turbine ignition set-up was constructed, which included the important ground bypass discussed in the patent application, and the subject timing light was installed.

The timing light power input lead was energized with a 12 volt DC voltage source as required, set to 12.5 volts DC, and measured to verify the voltage value. The inductive sensor clamp was installed over the gas turbine ignition lead, but due to the much larger gas turbine ignition lead diameter, the sensor clamp would not fully close around the gas turbine ignition lead. This concern is addressed below.

Tests Conducted and Results

- 1) The gas turbine ignition system was energized, which produced the standard 2 sparks per second at the igniter tip. The timing light trigger switch was pulled, and no light output indications occurred from the timing light.
- 2) A piece of non-magnetic steel was inserted into the sensor lead clamp to bridge the approx 3/8" gap in the open end of the clamp. This allowed the maximum signal strength available to go into the timing light. Again, the timing light trigger switch was pulled, and no light output indications occurred.
- 3) The above two tests were each repeated, with the same results that there were no output indications from the timing light.

Conclusion

The results show that using the automotive timing light method is not useful for gas turbine ignition systems. There are substantial differences between the two ignition

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APPENDIX A

systems, but the reasons why the automotive timing light is not compatible with the gas turbine ignition system were not investigated.

There are a few *possible* reasons, such as incompatible signal conditioning circuitry inside the timing light, signal suppression from the heavy braided grounding shield on the outside of the gas turbine system that is not used on the automotive system, smaller capacitance in the timing light's signal conditioner, or other circuit incompatibilities such as signal protection circuitry that reacts to the high current flow from the gas turbine system.

For whatever reason, the automotive timing light was not found usable for detecting spark events from a gas turbine ignition system.



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Robert Ponziani, Licensed Professional Engineer
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